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China: The Search for Offshore Oil

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An Intelligence Assessment

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*EA 82-10113
October 1982*

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China: The Search for Offshore Oil

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An Intelligence Assessment

This assessment was prepared by [redacted]
[redacted] Office of East Asian Analysis.
Comments and queries are welcome and may be
directed to the Chief, China Division, OEA, on
[redacted]

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**China: The Search
for Offshore Oil**

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Key Judgments

*Information available
as of 19 August 1982
was used in this report.*

China and 33 Western oil companies are about to complete four years of negotiations for rights to explore and develop large sections of the Chinese continental shelf. We expect contracts will be signed early in 1983 and that exploration will begin late next year. Japanese and French firms have already signed contracts and are well into exploratory drilling. One US firm, Atlantic Richfield, and its Kuwaiti-owned partner, Santa Fe, has also signed a contract [REDACTED]

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The contracts, in the form of production-sharing agreements, represent a long-term commitment by the companies to work closely with the Government of China—in some cases for as long as 35 years. The firms have spent more than \$300 million, mostly for geophysical surveys, since talks with Beijing began in 1978. An additional \$2 billion is now being committed to the first phase of exploration. If no oil is discovered, the firms can write off the investment and back out of the program. If exploration is successful, development expenditures could rise to \$20 billion or more—by far the largest Western investment under consideration for China—and profits for the firms could reach billions of dollars [REDACTED]

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Offshore oil production will not help solve China's current energy shortage. Even when it comes on stream in the late 1980s, it will in our view do little more than offset what we expect will be sharply declining onshore production. Success or failure of the offshore program will, however, determine whether China will continue to be an oil exporter in the 1990s—oil currently provides 20 percent of China's foreign exchange earnings—or whether it will join the ranks of the oil-importing countries at substantial cost to its foreign financial position [REDACTED]

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China had little choice but to abandon its policy of self-reliance in offshore exploration. A decade-long effort netted small proven reserves and insignificant production. Meanwhile, onshore petroleum reserves have been drawn down, output has peaked, and prospects in easily accessible sections of the country are dim. Offshore sedimentary basins offer the best hope for quick new discoveries, but China lacks the technology to explore and develop them effectively. [REDACTED]

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Extensive geophysical surveys undertaken by both China and Western firms and some exploratory drilling indicate good potential for commercial oil discoveries in the Bohai and Tonkin Gulfs and in the South China Sea. Only in the Yellow Sea have the surveys been disappointing. The East

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China Sea is considered to have the best prospects, although there are as yet far fewer data to go on and no indication that China intends to open it to Western firms. [REDACTED]

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Estimates of potential offshore petroleum resources are very tenuous at this early point in the exploration program. Chinese and occasional Western claims that there are over 100 billion barrels of ultimate crude oil reserves are not warranted by existing data. In our view a better guess is a range between 15 and 30 billion barrels, which will take decades to discover and develop. [REDACTED]

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Significant production of offshore oil will not begin before 1986 or 1987 and is unlikely to contribute much to the country's total output until early in the next decade. In the decade of the 1990s, we believe offshore output will rise to 1 or possibly even 2 million barrels per day, more than enough to offset declining onshore output. Such production would be comparable to present output rates in the UK's North Sea fields or Alaska's North Slope. [REDACTED]

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The involvement of US firms in China's offshore exploration program carries both opportunities and risks. Success in discovering and producing offshore oil will serve as an obvious and tangible benefit of China's opening to the West and to the United States in particular. Expanded investment and trade in both upstream and downstream facets of the petroleum industry could serve as an example for other industries. Failure to find oil, on the other hand, would have severe repercussions on China's economy and could spread doubts in China about the advantages in dealing with the West. [REDACTED]

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The involvement of US firms in sea boundary disputes between China and its neighbors is another risk, particularly in the Tonkin Gulf where Beijing is challenging Vietnamese claims. In our view, tensions between the PRC and such important US allies as Taiwan, Japan, and South Korea in the Yellow and East China Seas are also likely to rise as exploration proceeds in these areas. [REDACTED]

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China: The Search for Offshore Oil

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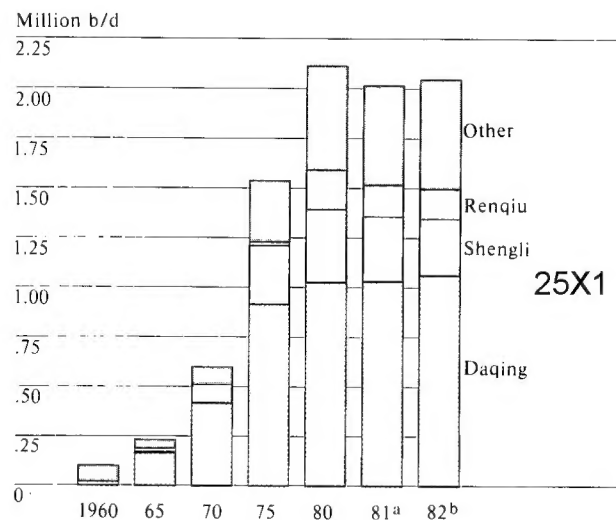
Onshore Prospects Dim

China's oil and gas production peaked in 1980 at slightly more than 2 million barrels per day (b/d) of oil and 14 billion cubic meters of gas. This output satisfied the country's basic requirements and allowed exports of approximately 350,000 b/d of crude oil and petroleum products. Oil output has since fallen by about 4 percent and gas output is down by a more severe 24 percent. Oil exports, which contribute over 20 percent of the country's foreign exchange earnings, have held up despite the production decline, but allocations of oil to industry, agriculture, and even to the military have been squeezed.

The primary cause for declining output is a substantial drawdown of onshore reserves in the past five years, especially in the key northern and northeastern basins. Only one major discovery was made in this region in the decade of the 1970s—the Renqiu fields in 1976. Thus, we calculate that total proven plus prospective oil reserves in this region have declined to 7 or 8 billion barrels, equivalent to only a 10-year supply at current output rates.

China's oil production is concentrated in several large oilfields in the Sungliao Basin in Manchuria and in onshore portions of the Bohai Bay Basin in north China. Daqing oilfield, in the center of the Sungliao Basin, produces half the country's output, and Shengli, Gudao, Dagang, and Liaohe, all along the coast of the Bohai, and Renqiu, about 100 kilometers inland, contribute another 40 percent. Almost all of these fields are in mature stages of production and decline is imminent if not already under way. Daqing, for instance, has exhausted over half its reserves, and oilfield managers publicly admit to being in a struggle to maintain output rates. The Shengli and Renqiu fields have already suffered declines in the last two years. Some exploratory drilling is continuing in the Bohai Bay and Sungliao Basins, and small fields such as the recently discovered Dongpu field continue to be discovered. Nevertheless, most geologists believe the best prospects in both basins have been drilled (figure 1).

Figure 1
China: Oil Production by Field, 1960-82



^a Shengli and Renqiu are estimated.

^b Projection based on first half output.

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Numerous small sedimentary basins in central and southern China have some potential for oil and gas. The Ministry of Petroleum has expended considerable effort exploring them because their locations are often close to consuming areas. Many small oilfields have been discovered and developed despite low productivity and high costs that would have made them non-commercial in the West. Total output from these fields is less than 100,000 b/d, only a few percent of the country's output.

The far west may ultimately be the best source of new petroleum reserves. Three very large prospective basins, Qaidam, Tarim, and Junggar, may ultimately yield 10 billion barrels of oil each.

A 30-year exploration effort on the margins of these

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desert areas has yielded a half dozen or so fields, but severe climatic and logistical problems have prevented development of all but two of them. So far no fields have been found that are big enough to warrant the 3,000-kilometer pipeline needed to move oil to the PRC's main consuming areas. Most of the area lacks even rudimentary roads and shifting sand makes any kind of construction work difficult. The Chinese have admitted publicly that even with a major exploration campaign it could be the end of the century before significant output can be obtained from the west. By that time there is little doubt that the onshore eastern fields will be depleted and that the country will face a severe oil shortage if alternative resources have not been discovered and developed (figure 2). [REDACTED]

Indigenous Offshore Exploration Fails

The continental shelf is thus the only likely source of oil that can be expeditiously exploited. The Chinese have been at work offshore for over a decade, but with rather poor results. As early as 1967 China's Ministry of Petroleum launched an offshore exploration program in the Bohai just off the onshore Dagang and Shengli fields. In the past 15 years over 100 wells have been drilled there with several small discoveries. In 1968 a geophysical survey of the East Asian continental shelf by the UN Economic and Social Council for Asia and the Pacific (UNESCAP) raised considerable hopes among Western and Chinese geologists for discovering oil resources in the Yellow Sea and the East and South China Seas. The Chinese then expanded their program to include these areas, and about 25 wells were drilled in the Yellow, East China, and South China Seas and in the Gulf of Tonkin. Although a good percentage of these wells discovered some oil, few if any located reserves large enough to be considered commercial. Only in the Bohai was a development program started and oil actually produced. [REDACTED]

There are both geologic and technological factors behind the Chinese failure to discover and produce large reserves:

- The complex geology of the Bohai Bay Basin where exploratory work was centered required better seismic surveys and more sophisticated analytical tools than China has been able to develop.

- Equipment problems often prevented completion of exploratory wells to target depths. Lack of good mud control, for instance, and the absence of large enough blowout preventers have often created major pressure control problems, particularly in the East China Sea and in the Gulf of Tonkin. In addition, recording instruments often failed to work and made it difficult for the geologists to interpret what the drill bit was penetrating.

- The Ministry of Petroleum and the petroleum equipment industry are far behind the state of the art required to efficiently produce oil offshore once it is discovered. Strategies used for onshore production including very intensive development of fields and large-scale water flooding are far more complex and costly in the offshore environment. [REDACTED]

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Abandoning Self-Reliance

By mid-1978, Beijing began to realize that the country's exploration program was failing to find the new oil reserves needed to pursue oil self-sufficiency policies and to support an oil export program. Late that year overly ambitious plans for producing 3 million b/d of oil by 1980 and 4 million b/d by 1985 were abandoned, and Beijing publicly admitted that it would be doing well just to hold output at 2 million b/d through the mid-1980s. [REDACTED]

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Concern over possible oil shortages and the prospects of reduction in earnings from oil exports contributed to the massive readjustment of economic plans and policies in the winter of 1978/79. Japanese officials were told, for example, that several major petrochemical plants on order from Japan would have to be canceled for lack of an assured feedstock supply. New policies were quickly put into effect to slow the rate of increase in the demand for oil. Plans to convert the country's railroads to diesel fuel, mechanize agriculture, and build up the small petrochemical industry

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Figure 2
China: Prospective Oil and Gas Basins



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were shelved or severely cut back. Where possible, electric power plants were told to shift back to coal, and hydropower began to receive more emphasis for future power supply. These measures contributed to an actual decline in petroleum consumption last year, although we believe the primary factor behind the energy savings was an overall decline in heavy industrial output. [REDACTED]

In order to have a chance of meeting future petroleum requirements, Beijing completely revamped its exploration and development policy. The most important policy change was with regard to offshore oil. Previously the Ministry of Petroleum had purchased some Western equipment for offshore work but had done all the exploration work on its own. Beijing, as best we can determine given the limited reporting available, first directed the Ministry of Petroleum to selectively enlist the help of Western and Japanese firms in the offshore effort then, spurred on by a 1979 disaster in which an imported jack-up rig capsized, killing all 72 aboard, virtually halted the Ministry's independent program in favor of letting the foreign companies take over. [REDACTED]

Joint venture agreements were signed with the Japan National Oil Company and with France's Elf Aquitaine and Total Exploration in 1979. The same year, US and other international oil firms were asked to participate in a major seismic exploration project in the South China and Yellow Seas. Atlantic Richfield, in a separate request, was asked to help explore and develop an area south of Hainan Island where the Chinese had located some oil. [REDACTED]

The Ministry of Petroleum also began to increase its use of foreign contractors for specific onshore jobs. For instance, a US firm was brought in for an 18-month project to control four wells which had blown out of control in the Tarim basin. In addition, US, French, and Japanese companies were hired to do seismic surveys over sections of the Qaidam, Junggar, and Ordos basins. [REDACTED]

Offshore Seismic and Drilling Results

Exploratory work on China's continental shelf that has already been completed under the 1979 agreements includes 11 wells drilled in the Bohai Bay, the Beibu Gulf (Gulf of Tonkin), and the Yellow Sea, as well as high-quality geophysical surveys of those areas and the South China Sea. All together, we calculate that the firms have spent over \$300 million in their attempts to evaluate the oil and gas prospects. The most important area that has not been evaluated by the firms is the East China Sea, where China continues to carry out its own program. [REDACTED]

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Chinese and some Western press estimates of the volume of China's potential offshore oil resources lie in a 100- to 300-billion-barrel range—the top of this range would make China a new Saudi Arabia. These estimates often include the unwarranted assumption that each structure is completely filled with oil. In some estimates barrels are confused with tons—a

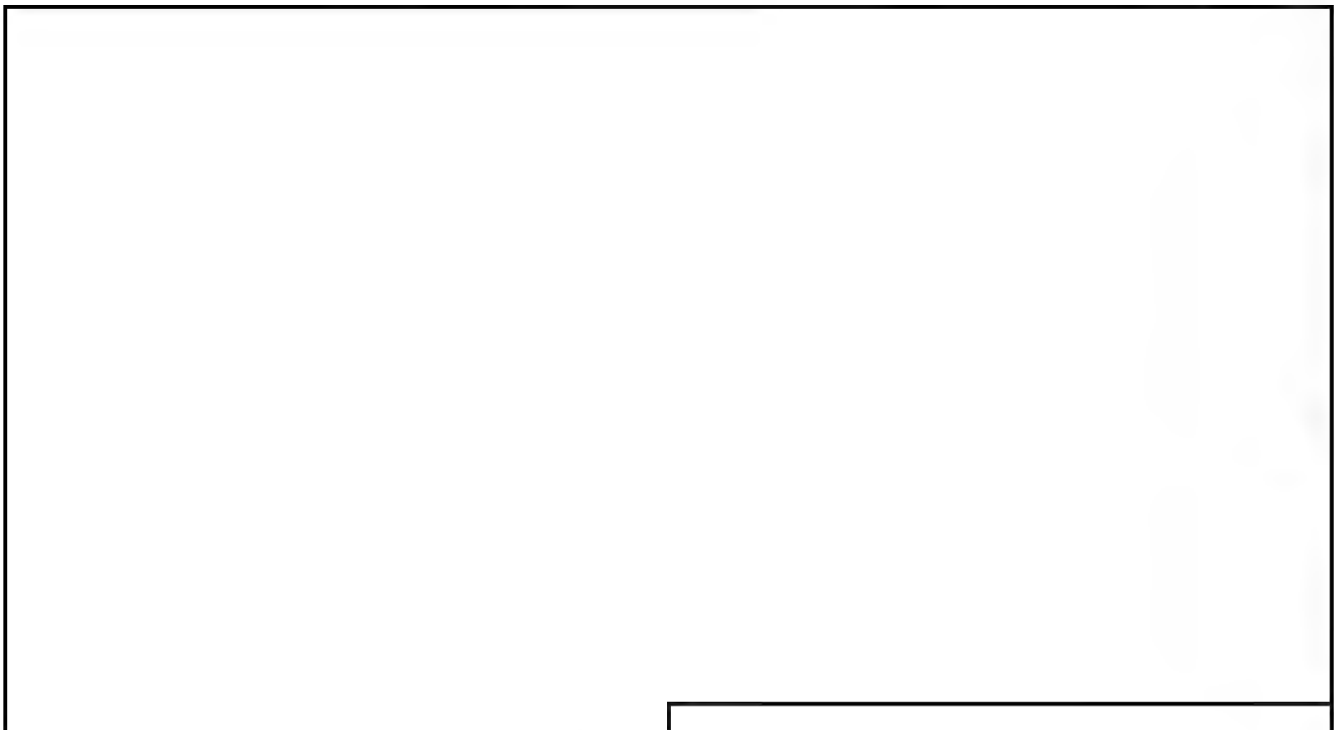
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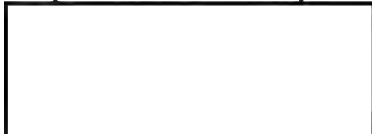
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difference of a factor of seven—and in others recoverable reserves are assumed equal to oil-in-place. Typically less than half of the oil-in-place can be recovered utilizing existing technology. [redacted]

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We believe that 15 to 30 billion barrels of recoverable oil is a better though admittedly still rough estimate of possible oil resources. [redacted]

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Even these estimates represent the potential for a great deal of oil, at the higher end of the range equivalent to slightly more than all the remaining *proven* reserves in the United States. At current market prices 30 billion barrels of oil would be valued at close to \$1 trillion—three times China's GNP. Tens of billions of dollars will be required to exploit such deposits if exploratory drilling proves they exist.



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We believe the importance of the offshore exploration program can perhaps best be illustrated by the use of three scenarios corresponding to degrees of success the companies may have in locating oil reserves offshore China. [redacted]

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Optimistic Case—A New North Sea. The 100 large geologic structures in the Pearl River Basin plus the 30 or 40 structures in the other areas that are being put up for bid certainly have, in our estimation, the geologic potential for reserves in the 20- to 30-billion-barrel range of Britain's sector of the North Sea fields. The East China Sea [redacted] could eventually add another 10 or 20 billion barrels, more than the Norwegian sector of the North Sea. [redacted]

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Discoveries on this order of magnitude would have a very significant impact on China's economy and on the firms that discovered and produced the oil. We believe the important results of such discoveries could be as follows:

- Total Chinese oil production, after stagnant or possibly declining output through the mid-1980s, would rise gradually through the 1990s to perhaps 4 million b/d by the end of the century. Offshore output could contribute perhaps 2.5 million b/d of the total by then, equivalent to current North Sea output rates. Onshore output will likely have declined from the current 2 million b/d, even considering a possible startup of some new western oilfields.
- Chinese crude oil exports would increase to perhaps 1 million b/d from their current 350,000 b/d rate in order to pay off the approximate \$30 billion investment by foreign oil firms and to give the firms their after-tax profit shares [redacted] Net Chinese earnings from petroleum exports could still double their current annual rate of about \$4.5 billion.
- The impact on the world oil market of an additional 650,000 b/d would be small, but it would allow Japan—the most likely market—a greater degree of

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Implications For China and US-Chinese Relations

US leadership in offshore oil exploration and production technology presents a good opportunity for long-term expansion of US commercial and political relationships with China. We believe the offshore contracts that China is currently negotiating with US firms may, in fact, become one of the most important commercial ventures yet signed with a Communist country. Billions of dollars, perhaps tens of billions of dollars, of Western investment eventually may be involved, but, more important, the contracts will represent a commitment by both the oil companies and the Chinese Government to deal with each other on a day-to-day basis for as long as 35 years. Over time, if the exploration program proceeds satisfactorily, we believe US firms will exert a powerful influence on the Chinese petroleum industry and could make an important contribution to China's economic development. [redacted]

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diversification from Middle East sources. Exports of 500,000 b/d to Japan would raise China's share of that market from the current 4 percent to about 10 percent. If China's current trading patterns are maintained, some 100,000 b/d of China's exports might reach the US west coast, a welcome possibility as Alaska's North Slope is expected to be in steep decline by the mid-1990s.

- China's domestic consumption of oil could rise at an annual average rate of about 5 percent in the 1990s after flat or even declining consumption in the 1980s. This would allow significant improvements in the country's transportation and petrochemical sectors, since coal and hydropower are expected to supply most of the increase in other industrial fuel requirements.
- US firms would stand in a good position to aid in the upstream segments of China's petroleum industry—everything from drill bits to offshore production platforms, as well as in downstream segments—the refining industries. Continued growth in the industry would be dependent on opening areas in deeper waters offshore and in the western basins, both of which would present new opportunities for US firms.
- China's industrial structure could change as success in oil industry joint ventures encouraged other Chinese industries to become more receptive to foreign investment. Location changes, including possibly rapid industrialization of southern China, particularly Guangdong Province, could also occur. Hong Kong and even Taiwan would also be affected by the impact of a booming oil program in the South China Sea.
- Success offshore China would intensify jurisdictional pressures in disputed areas of the East Asian continental shelf. The Taiwan issue would be central to almost any settlement. Japan, South Korea, and Vietnam would also likely become embroiled (appendix B).

Pessimistic Case: Baltimore Canyon Revisited. The Baltimore Canyon area, off the Atlantic Coast, was considered by the US Geological Survey as a very

good prospect for oil and gas in 1975. Several years and several billion dollars later, no commercial reserves have been identified. [REDACTED] 25X1

Because of the breadth and variety of prospects off the Chinese coast, we believe it is unlikely that no commercial reserves will be located. Nevertheless, oil exploration is still much less than an exact science and there is always the possibility that the firms will not find significant quantities of oil. The impact would be in our estimation very critical to China:

- Unless large new reserves were quickly located in eastern China, Chinese petroleum output would decline sharply from the mid-to-late 1980s through the mid-1990s. Exports would quickly dry up and China would become a net importer by the early 1990s. These imports would not be large enough to influence the world market in the main because China would not be able to afford large imports of oil. Shortage of foreign exchange created by the absence of exports would severely limit China's ability to import capital equipment for other industries.
- The Western oil firms would lose whatever money they put into exploration but would not incur the much larger development expenses. Most firms would probably pull out after the first or second stages of exploration in order to cut their losses.
- China's energy policy, in particular Beijing's willingness to depart from the self-reliant policies of the past few years, would come under domestic criticism and perhaps be reversed. Western firms probably would be criticized for not exploring thoroughly. Foreign exchange shortages and dissatisfaction by both the firms and the Ministry of Petroleum would make it difficult to take the next logical step—exploration of the far west on a joint venture or consortium basis [REDACTED] 25X1

More Likely: A New Indonesia. Indonesia produces over 1 million barrels a day of oil from offshore reserves in the southern part of the South China Sea. Our best estimate is that China's offshore oil output

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in the 1990s will be slightly less than that of Indonesia, or about 1 million b/d. Even this moderate level of production has important implications for China and its relations with the West:

- Offshore output in this case would do little more than offset an expected decline of about 500,000 b/d onshore a decade from now. Oil exports, after falling in the mid-1980s, might regain current rates, but net earnings would fall as development costs would have to be repaid [REDACTED]
- Domestic oil consumption could grow at only about 1 percent per year until major reserves were developed in the far west. This growth—only matching expected population growth—would make it difficult to improve the capabilities of the transportation and petrochemical sectors for supporting the overall goals of industrialization. Tough decisions balancing the trade-offs between foreign exchange earned from oil exports and the domestic use of fuels would be necessary.
- Continuous disputes could be expected between the Ministry of Petroleum and the foreign firms over whether to develop marginal oilfields. Firms would have invested billions of dollars in the larger oilfields and would need to stay on good relations with Beijing to protect their equity. Beijing, in order to maximize output, however, would push the firms to develop small, and in the firms' view, uneconomical, fields.
- The relatively small scale of the development program—perhaps 20 production platforms—would make a much smaller impact on China's petroleum equipment industry than in the optimistic scenario, but large investments would still be required to modernize the refining industry to improve the efficiency of oil use. Chinese industry would be heavily influenced by the US firms and good opportunities would remain available for these firms to sell equipment and engage in joint exploration programs onshore. [REDACTED]

US Participation Not Assured. At best, months of difficult negotiations still remain before contracts with the bulk of US firms are signed. ARCO's

difficulties over contract details that held up signing for over a year could, moreover, be repeated. Several smaller firms have already dropped out. [REDACTED]

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Nonparticipation by the major US firms would, we believe, greatly retard the program, but foreign oil companies could take up some of the slack. British Petroleum, for instance, is organizing a block of five non-US companies to bid jointly on blocks. Royal Dutch Shell, despite Beijing's dispute with the Netherlands over submarine sales to Taiwan, retains its eligibility to bid. Smaller companies such as the Japan National Oil Company will probably win some blocks even with US competition, and as long as they have access to subcontractors—many of which are American—for specialty jobs, they could move ahead with an exploration program. [REDACTED]

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A limited program with no direct participation by the US majors would, we believe, be much more dependent on early discoveries than would be the comprehensive program now being planned by the Chinese. Early success would stimulate the interest of the oil firms, who can provide the capital needed to carry out a thorough exploration program; early failures, however, would quickly dry up interest and funds and delay further exploration for decades. Beijing would also be confronted with a situation in which Japanese capital might play a dominant role, a possibility for which Beijing has already expressed concern. [REDACTED]

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China, by letting US firms take the lead in the important South China Sea seismic survey program, has in our view already underlined the high value it places on participation by these firms in the oil exploration program. Ministry of Petroleum officials have stated that they will do whatever it takes to include the US majors. Large-scale production offshore China is to a considerable extent a state-of-the-art problem and will continue to be through the end of the century as exploration proceeds to deeper waters. Beijing recognizes that it must accept some degree of dependence on the US oil companies in this endeavor but will couple this new dependence with a determined effort to improve its own technological base (appendix C) in order to retain as much self-reliance as possible. [REDACTED]

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Appendix B

Territorial Disputes in the East Asian Continental Shelf

The East Asian continental shelf claimed by China is not uncontested. China has made only generalized claims to the shelf but has frequently disputed claims made by neighboring countries. Primary areas of dispute are the central portions of the Yellow and East China Seas and the Gulf of Tonkin. China until recently took a cautious approach to exploration in these waters but more recently has taken up a more aggressive approach. The PRC is now challenging Vietnamese claims in the Tonkin Gulf and drilling far out in the East China Sea close to areas claimed by Taiwan, Japan, and both Koreas. Discovery of commercial-scale oil resources anywhere on the shelf would raise these issues to a higher level of sensitivity and may eventually make settlement more difficult. The mutual need for oil reserves, on the other hand, might enable these countries to put aside political differences in an attempt to negotiate some kind of agreement. [REDACTED]

North and South Korea basically use the equidistance principle in claiming about half of the *Yellow Sea* for Korea. China has at least de facto accepted this principle for the Korea Bay in the northern Yellow Sea, where it is giving some assistance to North Korean oil exploration. Beijing challenged South Korea's Yellow Sea claim, however, and in 1973 forced Gulf Oil Corporation to stop drilling in a South Korean concession which stretched somewhat over the hypothetical equidistance line. China has consistently refused to discuss the matter with Seoul, however, claiming P'yongyang is the only Korean authority. Poor seismic and drilling results so far have muted the Yellow Sea problem, and it may not rise again. The new Chinese concessions are well on their side of the Yellow Sea. [REDACTED]

More problematic is the *East China Sea*, central areas of which are contested by China, Taiwan, Japan, and both Koreas. [REDACTED] In 1978 Japan and South Korea reached agreement on a joint development zone (JDZ) for the northeastern East China Sea,

compromising each country's position. China immediately contested the agreement but has done nothing to prevent Korea from drilling three wells in the JDZ, all of which were dry. Korean exploration in the area is intensifying with three new wells to be drilled by Texaco and the Korean American Oil Company this year. China also has begun drilling wells just on its side of the JDZ—the rigs are escorted by military patrol boats—but the effort has been plagued with technical difficulties. The JDZ itself may well become less of an issue if the new Korean wells turn out dry. Geologically it is considered only marginally prospective with much better prospects to the south in the area where the Chinese are drilling. Of course a Korean discovery could force the issue, which so far China has refused to discuss. [REDACTED]

Potentially more troublesome is the 250,000-square-kilometer area between the JDZ and Taiwan, [REDACTED] of very favorable petroleum geology. Taiwan and Japan both claim much of the area and in the early 1970s granted concessions to oil companies to explore and develop it. China immediately disputed both claims, and little exploratory work was carried out by the firms. Since 1980, Beijing's Ministry of Geology has been running seismic surveys in the area but has not opened it to Western firms for exploration. [REDACTED]

Both Beijing's and Taipei's claims are based on the continental shelf principle, which under most interpretations gives China almost all the prospective area. Tokyo is on less firm ground in arguing the equidistance principle based on its Ryukyu Island chain and a small uninhabited cluster of islands, the Senkakus. These islands—called *Diaoyutai* in Chinese—also claimed by China, are central to the legal issue, because they clearly rest on the continental shelf, whereas the Ryukyu's are separated from the shelf, by the deep Okinawa Trough. Technically, Japanese [REDACTED]

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ownership of the Senkakus would establish a Japanese presence on the shelf and thus would help to nullify the continental shelf criterion. [REDACTED]

Japan has approached the matter very cautiously, however, and has not officially drawn a line setting out its claim. Instead it has repeatedly asked Beijing to negotiate the issue in hopes of working out a joint development scheme as was arranged with Korea [REDACTED]

Taipei's claims to offshore resources both off the mainland and around the island have been weakened drastically by its expulsion from the United Nations and by the recognition of the PRC by Japan and the United States. Nevertheless, Beijing has followed a moderate course with regard to Taiwan island, letting Taiwan's China Petroleum Corporation (CPC) drill in waters within the island's territorial seas where some gas has been discovered. [REDACTED]

large "no exploration zone" on the western or Vietnamese side of the meridian. The most reasonable alternative to using the median approach is the equidistance formula, which would give Vietnam a larger share of the northern part of the Gulf but would give China more of the central section. China is not likely to accede to an equidistance approach for fear of compromising the basis for its claims to the Yellow and East China Seas. [REDACTED]

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In addition to these Chinese claims, China also claims the bulk of the entire South China Sea by virtue of claims to a number of island groups, which, according to its historians, have belonged to China for centuries. Vietnam, the Philippines, and Malaysia have been drilling in the southern part of the South China Sea for years, however, and it is doubtful China can make its claims stick. Most of the central area is in waters too deep to drill using present technology. For these reasons prospects in the central and southern South China Sea are not discussed in this paper. [REDACTED]

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The *Pearl River Mouth Basin* is uncontested except for possibly a small section to the northeast which falls approximately equidistant between Taiwan and the mainland. CPC drilled one well there in 1977 and discovered some gas. [REDACTED]

Vietnam has proposed that the *Gulf of Tonkin* be divided along the 108° 03' 18" meridian, which was used in an 1887 Sino-French treaty to allocate ownership of islands in the northern part of the Gulf (see figure 4). Beijing denies that that treaty had anything to do with dividing up the Gulf itself. Again China refuses to make a specific claim but has suggested a

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Appendix C

Technological Support for Offshore Exploration

Chinese exploration and development contracts will require the Western partners to purchase as much equipment and use as many services as can be competitively provided by Chinese suppliers. Many Chinese organizations, including shipyards, oil equipment manufacturers, and local and provincial committees, are gearing up with the expectation of providing a substantial share of the goods that will be required for a major exploration effort. The generally poor quality and lack of reliability of many Chinese oil industry products could slow the program and ultimately make it more costly. There is little doubt, however, that Chinese industry will make considerable gains in efficiency as foreign firms sell and barter Western technology. [REDACTED]

China's oil industry is in theory capable of supplying most pieces of equipment, tools, and materials required for offshore oil exploration. Major oil equipment supply factories in Shanghai, Baoqi, Lanzhou, and Xian have supplied the onshore industry for years with everything from seismic processing equipment to drilling rigs, pipe, and bits. Much of this equipment, however, has been of inferior quality. Chinese shipyards have designed and constructed their own jack-up rigs and have improvised their own drill ships for deeper water drilling. Even a sophisticated semisubmersible rig is under construction with little foreign help. [REDACTED]

The very success that the domestic oil supply industry has had poses problems for both the Ministry of Petroleum and the Western joint-venture partners. The domestic industry is often powerful enough to force even the Ministry of Petroleum to buy Chinese-made equipment, when in many cases the equipment is of such inferior quality that it leads to abandoned or out-of-control wells. [REDACTED]

Billions of dollars in foreign exchange earnings through the export of crude oil in recent years has made it easier for the Ministry to import Western

equipment. Most offshore rigs are now imported, as is a large proportion of the drilling pipe and bits used for both offshore and onshore drilling. Many of the more sophisticated imports, however, have been misused due to stinginess in paying for training, spare parts, and auxiliary equipment. The capsizing of the imported Bohai 2 jack-up rig in 1979 is only the most dramatic example. The overall result has been very inefficient use of both domestic and imported resources over the past decade. [REDACTED] 25X1

Kang Shien, the recently retired Minister of Petroleum, was well aware of these problems and was a leading advocate of the joint venture procedure whereby Western firms supply material, part of the management for equipment that is assembled in China. Projects of this sort have been multiplying in the last year and should be able to make a substantial contribution to the exploration effort. Kang was retired but presumably his replacement, Tang Ke, will follow the same policies. [REDACTED] 25X1

Offshore Mobile Drilling Rigs

The Ministries of Petroleum and Geology currently own 10 mobile jack-up rigs capable of drilling in maximum water depths of from 40 to 90 meters

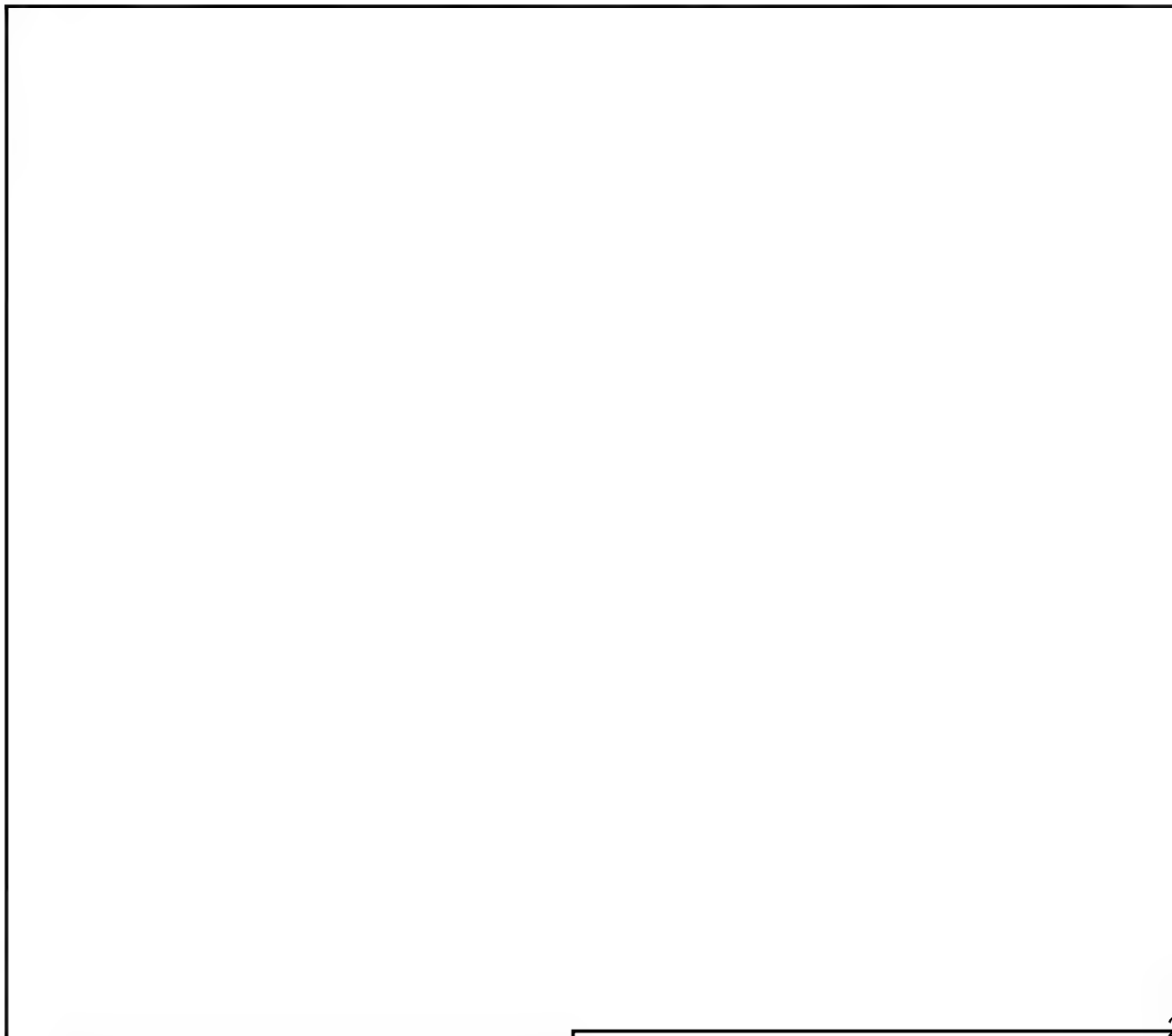
[REDACTED] Eight * of these have been purchased from Singapore and Japan over the past seven years. Two each are being used in the Bohai, the East China Sea, and the Gulf of Tonkin. One has been leased to a US firm working off Malaysia and another is up for sale. [REDACTED] 25X1

Early in the offshore exploration effort, China started its own rig-building program. The Dalian shipyard built two rigs patterned after the imported Bohai 2. These have not worked out well. The Bohai 1 is being retired after only 10 years of sporadic work, [REDACTED] 25X1

* This figure does not include the ill-fated Bohai 2 imported from Japan in 1973. [REDACTED] 25X1

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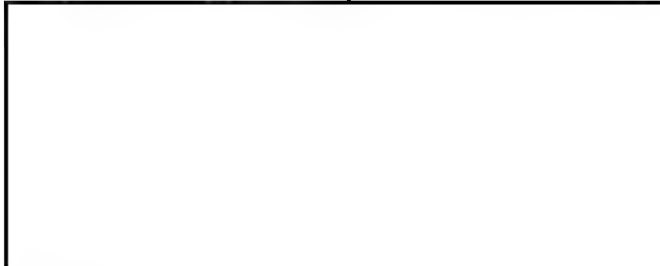


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Bohai 3, which went into service in 1979, drilled only for a couple of months and has been in port ever since. Design and material problems, including a cracked deck and miserable crew quarters, have apparently caused it to be abandoned.

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Production Platforms

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Guangzhou's Hwangpu shipyard is also attempting to get into the jack-up rig business. It has signed a joint venture agreement with a Singapore firm to build a Bethlehem-design rig with major parts, such as the legs, imported from Singapore. 

China has developed only limited experience in building and operating the floating type rigs—semisubmersibles and drill ships—that will be required in much of the South and East China Seas. One drill ship was improvised in the early 1970s by attaching two freighters in catamaran fashion with a drilling platform between them. The Ministry of Geology imported a semisubmersible, the Nanhai 2, which has been used in the Yinggehai Sea. The Chinese wanted to lease the rig to ARCO for its exploration work, but ARCO found the rig in need of extensive repairs, because the Chinese had enlarged the crew quarters—thus changing the center of gravity. These modifications are now under way in Hwangpu shipyard, near Gwangzhou. 

A major part of the expense in offshore development is the construction of huge permanent platforms from which development wells can be drilled and oil produced. These structures must be taller than the water depth and built to withstand great current, wave, and wind forces. The Chinese have gained some experience building small platforms for the shallow-water Bohai fields—up to about 50 meters of water—but have yet to attempt constructing the much larger platforms that will be required farther out in the Bohai and in most of the other offshore prospective areas. Production from a good portion of the South China Sea, for instance, will require platforms from 200 to 250 meters tall—the height of a major skyscraper. These platforms can cost upwards of \$200 million each, and scores of them will be required if exploration is successful. 

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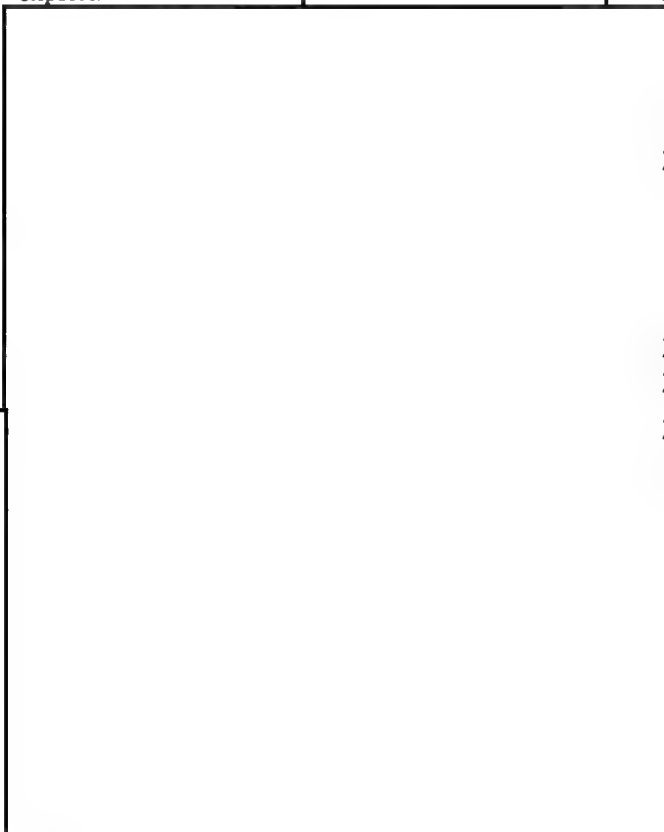
A third attempt to develop semisubmersibles has been the design and construction of the Kantan 3 in a Shanghai shipyard. After more than three years of construction, the rig appears close to completion, but the Chinese admit to major design problems, which may prevent it from going into operation. 

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[REDACTED]

The Chinese civil aviation service has provided little in the way of helicopter support services vital to the safe and efficient use of offshore rigs. Crashes and poor maintenance have depleted the small helicopter force they once had. Major steps are being taken to improve the situation by the time the Pearl River Basin exploration begins. In a major joint venture project, China is to assemble 50 medium-size Dauphin helicopters with parts supplied from France. Several units have already been built. A few larger and longer range helicopters are expected to be imported from the United States. Recently a helicopter service company was set up in Guangzhou and another is planned, probably for Tanggu, which will be dedicated to offshore supply work. Western firms will have to work with these firms, as Chinese law prohibits them from using their own aircraft. [REDACTED]

Service and Support Bases

Western firms have been somewhat concerned about the lack of support services for the exploration program. Again, however, the Chinese have begun negotiations with foreign suppliers for a wide variety of support projects which, we believe, if speedily implemented will contribute greatly to the exploration program. [REDACTED]

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Support for offshore exploration thus far has been limited to two marginally adequate bases, Tanggu for the Bohai and Zhanjiang for the Gulf of Tonkin and South China Sea, and to the better capabilities of the Shanghai area for East China Sea work. New bases are planned for Sanxia on Hainan Island and Qiwan just north of Hong Kong to better support exploration in the Yinggehai and South China Sea areas.

Guangzhou, though somewhat removed from the prospective area, will increasingly serve as a rear support base. Qingdao is to be set up as the Yellow Sea support base. We believe major service requirements such as rig repair will probably be handled by Singapore and perhaps Hong Kong. [REDACTED]

The French firm, Total Exploration, has had the most experience in relying on Chinese servicing and on the whole has not been very complimentary. Major complaints have been registered concerning lack of adequate helicopter support, the difficulty of getting repair work done, and poor living and working conditions at their Zhanjiang support base. [REDACTED]

Communications are also slated for improvement. CNOOC is attempting to set up a satellite communications system, using Intelsat IV or V, to link offshore rigs with their support bases, Beijing headquarters, and possibly the companies home offices. Negotiations are under way with three US firms and with Nippon Electric Corporation for the multimillion-dollar system. [REDACTED]

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Manpower and Training


In addition to using as much Chinese-made equipment as possible, the Chinese will insist—as indicated in the “model contracts”—on considerable use and training of Chinese labor in the exploration and development work. Some training is already under way both in China where US firms have sent training

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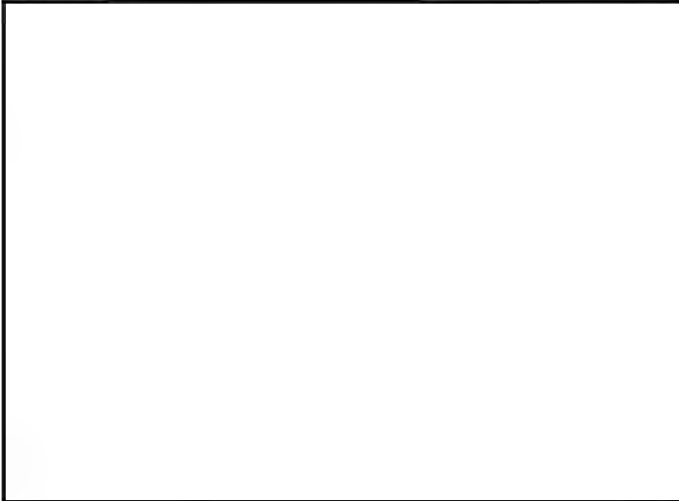
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teams and in the United States, where hundreds of Chinese are enrolled in petroleum engineering schools. 

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Appendix D⁹Regulations of the People's Republic
of China on the Exploration of
Offshore Petroleum Resources in
Cooperation With Foreign Enterprises

Chapter I. General Principles

Article 1

In the interest of developing the national economy, expanding international economic and technological cooperation, and safeguarding national sovereignty and economic interests, these regulations are formulated to permit foreign enterprises to participate in the cooperative exploration of offshore petroleum resources of the People's Republic of China.

Article 2

All petroleum resources in the internal waters, territorial waters and continental shelf of the People's Republic of China and the maritime resources in all waters within the limits of national jurisdiction of the People's Republic of China are owned by the People's Republic of China.

All buildings and structures installed in the aforementioned sea areas to exploit petroleum and vessels serving the petroleum operations, as well as the corresponding onshore oil and/or gas terminals and bases, are under the jurisdiction of the People's Republic of China.

Article 3

The Government of the People's Republic of China protects, in accordance with the legislations of force, investments by foreign enterprises participating in the exploitation of offshore petroleum resources, their share of profit and other legitimate rights and interests, and their activities in cooperation exploitation.

All cooperative activities to exploit offshore petroleum resources within the scope of the regulations shall comply with the laws and decrees of the People's Republic of China and relevant state stipulations. All persons and enterprises taking part in the petroleum

operations shall be bound by the laws of China and shall accept inspection and supervision by the current authorities of the Chinese Government.

Article 4

The Ministry of Petroleum Industry of the People's Republic of China is the competent authority in charge of the exploitation of offshore petroleum resources in cooperation with foreign enterprises. The ministry determines forms of cooperation and demarcates areas for cooperative exploitation in accordance with the zones and surface area designated by the state. It works out plans for the exploitation of offshore petroleum resources in cooperation with foreign enterprises in accordance with the long-term state economic program, formulates operational and management policies, examines and approves the overall development program for offshore oil and/or gasfields.

Article 5

The China National Offshore Oil Corporation (CNOOC) is in full charge of the work of exploiting offshore petroleum resources in the People's Republic of China in cooperation with foreign enterprises.

CNOOC is a state corporation with the qualifications of a juridical person which has the exclusive right to explore for petroleum within the areas of cooperation and to develop produce and market it.

CNOOC may establish regional subsidiaries, specialized companies, and overseas offices to carry out the tasks entrusted by the head office as the work requires.

Article 6

CNOOC shall, by calling for bids and entering into petroleum contracts with foreign enterprises, exploit

⁹ The source of these regulations is FBIS, 11 February 1982. Italics have been added for emphasis.

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offshore petroleum resources in cooperation with foreign enterprises in accordance with the zones, surface area, and areas demarcated for cooperative exploitation.

Petroleum contracts referred to in the preceding paragraph shall come into force after approval by the Foreign Investment Commission of the People's Republic of China.

All documents signed by CNOOC in other forms of cooperative exploitation of petroleum resources utilizing technology and funds provided by foreign enterprises shall also be subject to approval by the Foreign Investment Commission of the People's Republic of China.

Chapter II. Rights and Obligations of the Parties to Petroleum Contracts

Article 7

CNOOC shall exploit offshore petroleum resources in cooperation with foreign enterprises by entering into petroleum contracts. Unless otherwise specified by the Ministry of Petroleum Industry or in the petroleum contract, *the foreign enterprise that is one party to the contract (hereafter "foreign contractor") shall provide exploration investment, undertake exploration operations and bear all exploration risks. After a commercial oil and/or gas field is discovered, both the foreign contractor and CNOOC shall make investment in the cooperative development. The foreign contractor shall be responsible for the development and production operations until CNOOC takes over the production operations when conditions permit under the petroleum contract. The foreign contractor may recover its investment and expenses and receive remuneration out of the petroleum produced according to the provisions of the petroleum contract.*

Article 8

The foreign contractor may export the petroleum it receives and its share and/or purchases and remit abroad the investment it recovers, its profit, and other legitimate income according to law.

Article 9

All Chinese and foreign enterprises involved in the exploitation of offshore petroleum resources shall pay taxes in accordance with the tax laws of the People's Republic of China and pay royalties.

Any employee of the said enterprises in the preceding paragraph shall pay individual income tax according to law.

Article 10

The equipment and materials imported for the implementation of the petroleum contract shall be exempted from customs, or levied customs at a reduced rate, or given other preferential treatment in accordance with state regulations.

Article 11

The foreign contractor shall open a bank account in accordance with the stipulation of the provisional regulations for exchange control of the People's Republic of China.

Article 12

In implementing the petroleum contract, the foreign contractor shall use *appropriate and advanced technology and managerial experience and is obliged to transfer the technology and pass on the experience to the personnel of the Chinese side* involved in the implementation (hereinafter "Chinese personnel").

In the course of petroleum operations, the foreign contractor must give preference to the Chinese personnel in employment, keep the percentage of Chinese steadily rising, and train the Chinese personnel in a planned way.

Article 13

In the course of implementing the petroleum contract, the foreign contractor must accurately report the petroleum operations to CNOOC in due time; and during the operations it must acquire complete and accurate data, records, samples, vouchers, and other original data, and regularly submit to CNOOC the

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necessary data and samples as well as technological, economic, financing and accounting, and administrative reports.

Article 14

For the implementation of the petroleum contract, the foreign contractor shall establish its subsidiary or branch or representative office within the territory of the People's Republic of China and fulfill the registration formalities according to law.

The domiciles of the subsidiaries, branches and representative offices mentioned in the preceding paragraph shall be determined through consultation with CNOOC.

Article 15

The provisions of Articles 3, 8, 9, 10, and 14 of the regulations shall apply to foreign subcontractors which render services to the petroleum operations.

Article 16

In order to achieve the highest practicable ultimate oil recovery, the operation shall work out an overall development plan for each oil and/or gas field and conduct the production operations in accordance with the regulations and relevant rules promulgated by the Ministry of Petroleum Industry on exploitation of petroleum resources and with reference to international practice.

Article 17

For the implementation of the petroleum contract, *the foreign contractor shall use the existing bases within the territory of the People's Republic of China. If a new base is needed, it shall be established within the territory of the People's Republic of China.*

The location of the new base and such arrangements as may be necessary in special circumstances shall be subject to prior written approval from CNOOC.

Article 18

CNOOC has the right to send personnel to join the foreign operator in making master designs and engineering designs for the implementation of the petroleum contract. *Design corporations within the territory of the People's Republic of China shall have*

priority in entering into subcontracts for the master designs and engineering designs, provided that the terms offered by these design corporations are competitive.

Article 19

The operator must give preference to manufacture and engineering companies within the territory of the People's Republic of China in concluding subcontracts for all facilities to be built in implementing the petroleum contract, including artificial islands, platforms, buildings and structures, *provided that they are competitive in quality, price, term of delivery, and services.*

Article 20

As for the equipment and materials required to implement the petroleum contract, the operator and subcontractors shall give preference to procuring and using equipment and materials manufactured and supplied by the People's Republic of China, provided that these are competitive.

Article 21

As for the services required to implement the petroleum contract, including services for geophysical prospecting, well drilling, diving, helicopters, vessels, and onshore bases, the operator and subcontractors shall enter into subcontracts and service contracts with relevant enterprises within the territory of the People's Republic of China, provided that these services are competitive in price, efficiency, and service quality.

Article 22

All assets purchased and built by the foreign contractor for implementation of the petroleum contract in accordance with the plan and budget shall be owned entirely by CNOOC when the foreign contractor has fully recovered its investment for those assets (but the rental equipment from any third party is excluded). Within the term of the petroleum contract, the foreign contractor may be allowed to continue to use those assets in accordance with the provisions of the contract.

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Article 23

CNOOC is the owner of all the data, records, samples, vouchers and other original data obtained in the course of the petroleum operations, as provided in Article 13 of the regulations.

The utilization, transfer, donation, exchange, sale and publication of the afore-mentioned data, records, samples, vouchers and other original data and their delivery and transmission to outside the People's Republic of China shall be conducted in accordance with the rules on the control of data and information formulated by the Ministry of Petroleum Industry.

Article 24

The operator and subcontractors shall carry out the petroleum operations in compliance with the laws and rules on environment protection and safety of the People's Republic of China, and with reference to international practice to protect fishery and other natural resources and prevent the air, seas, rivers, lakes, and the land from being polluted or damaged.

Article 25

The petroleum produced within the petroleum contract area shall be landed in the territory of the People's Republic of China or may be exported from oil and/or gas metering point of offshore terminals.

In case such petroleum has to be landed outside the territory of the People's Republic of China, the approval of the Ministry of Petroleum Industry must be obtained.

Article 26

In case of war, threat of war, or other emergency circumstances, the Government of the People's Republic of China shall have the right to requisition a portion or all of the petroleum obtained and/or purchased by the foreign contractor.

Chapter III. Supplementary Provisions

Article 27

Any dispute arising between foreign and Chinese enterprises during the cooperative exploitation of offshore petroleum resources shall be settled amicably through consultations. *If the parties to the dispute fail to arrive at a solution through consultation, the dispute may be settled through mediation or arbitration by an arbitration body of the People's Republic of China, or through arbitration by another arbitration body agreed upon by both parties.*

Article 28

In case an operator or subcontractor violates the regulations in conducting petroleum operations, the Ministry of Petroleum Industry is authorized to warn the operator or subcontractor and demand remedy within a limited time. Should the operator or subcontractor fail to remedy the violation within the specified time, the ministry shall have the right to take necessary steps, even to the extent of suspending its right to conduct the petroleum operations. All economic losses so incurred shall be borne by the party responsible.

The party responsible for serious violation of the regulations shall be fined or even be sued before juridical authorities by the Ministry of Petroleum Industry.

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